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MECHANICS' AND INVENTORS' JOURNAL

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FLUORSPAR has lately been found in quantities in Hardin County, Ill. The specimens are of all colors; the large veins are generally white.

Scientific News,

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ILLUSTRATED

1880. *Scientific News*. 1880

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THE next number will complete the second volume of our paper, and as most of our subscriptions will expire at that time we not only hope they will be promptly renewed but that our friends will get others to join them. Our premium list is an attractive one (see page 283) and should incite zealous efforts to get up clubs.

THE ILLUSTRATED SCIENTIFIC NEWS, for 1880, will be enlarged to twelve pages of the size of *Harper's Weekly*. The cost of this increase to us will be 50 per cent. Will not our friends help us to make it up by a large increase to our subscription list?

DURING the coming year our paper will be not only enlarged, but it will be improved in the variety of its reading matter, and in its illustrated subjects.

Whoever subscribes will get a good deal for the investment. Please send in your subscriptions.

ANSWERS TO THE WHEEL PUZZLE given in our last have been received which will duly receive notice when other answers are in.

REPORTS from Washington indicate that quite a national epidemic has recently broken out in the Examining Corps of the Patent Office, and the natural result is that during the prevalence of the money-moon distemper business is accumulating.

It is also said that Commissioner Paine will soon resign to take a commissionship of the District of Columbia. We hope this is nothing but rumor. Gen. Paine has proved a good officer and although the emoluments of his office are beggarly, still we should regret to part with him. Our government is miserly in the treatment of its officials, therefore it cannot expect very long to retain able men who can readily earn more in other callings.

DR. JAGER of Stuttgart, Germany, has been making a fresh investigation into the subject of the human nose. He thinks that the human nose is the seat of the human soul, and that the workings of the latter are recorded on the surface of the former; also that by the use of certain volatilizing chemicals in the nostrils specific traits of character can be produced or changed. Hereafter we suppose sneezing will take rank among the tender expressions of sentiment, and blowing of the nose will be reverently performed as a religious exercise.

Unconstitutionality of the Trade-Mark Laws.

The decision rendered in the United States Supreme Court in the cases of the United States against Ansell, Stevens and Adolph Wittenberg, of New York and W. W. Johnson *et al.* of Cincinnati, which we give in another place, is one which in its general effect upon the internal commerce of this country, is of much more than ordinary importance.

The law in question gave great facilities for the prosecution of offenders against the rights of others in trade-marks. These rights have always been recognized in and protected by common law, but the practice and rulings in the courts of the different States varies so much, that the uniformity secured by the United States Trade mark law, now decided to be unconstitutional, rendered the course of procedure in obtaining relief far more certain and easy than an action in the State courts, and the penalties were more severe.

The effect of the decision will probably be to put an end to the registration of trade-marks. It will also probably put an end to many important litigation now pending.

The question of constitutionality thus decided adversely to the law, was raised upon a denial of the rightful authority of Congress to pass such a law. The highest tribunal decides that the Constitution confers upon Congress no such authority.

We think it is to be regretted that a general regulation of the use of trade-marks is thus found impossible. Its working has so far been very salutary to commercial interests, and it was, we believe, favorably regarded by the entire mercantile and manufacturing public. If at any future time further amendments of the Constitution be adopted, an amendment giving Congress power to enact such a law ought to be one of them.

Shall Trade Mark Fees be Refunded?

This Official Gazette of the U. S. Patent Office for Nov. 12, 1879, states that the total number of trade marks registered up to that date, since the law went into operation July 8, 1870, is 7,777.

From this total it is clear that, taking into account the application of the amount of money paid into the Treasury for fees upon trade marks cannot fall much short of a quarter of a million of dollars.

This money which has been paid in good faith for what now appears to be worthless and which the Patent office had no valid right to receive, ought to be refunded.

It may be argued that for many of the trade-marks registered the applicants have received already a *quid pro quo*, in the protection already afforded, but it follows as a matter of course that all judgments obtained under a law determined by the highest tribunal to be unconstitutional, cannot be sustained, and a door seems to be opened for the recovery of damages paid for infringements and even for the recovery of damages for penalties inflicted under the subsequent statute of 1876, which provides that a fine not exceeding one thousand dollars, or imprisonment for not more than two years, may be inflicted for the counterfeiting or the sale of counterfeit trade-mark goods.

The whole matter does not reflect great credit upon American legislation. It would appear that the question of constitutionality ought to have been determined before the passage of the act.

At all events, we think there can no question that the fees should be refunded. Should this be done it would only partially reimburse the expenses of registration.

Scarcity of Skilled Labor.

FROM several quarters we learn that there is now in this country, a scarcity of skilled labor in some industries. How far this extends or how important may be its effects upon wages we are unable to say. We give only such facts relating to the subject as we have obtained.

From a leading clothing establishment in this city, in which the custom department is probably as largely patronized as any in this country, we learn that the wages for fine coat hands are ruling high, and that most of the help in this department comes from abroad, very few Americans seeming desirous to learn this trade.

In the far trade we are told a similar lack of skilled labor exists, many large establishments being obliged to delay the filling of orders on this account.

Skilled house servants are difficult to obtain and command high wages.

A strike of the East River longshoremen in this city has resulted favorably to the strikers, the demand for this class of labor being in excess of the supply for handling the enormous quantity of freight now crowding every channel of transportation.

It would appear that it is the tendency of a protected period of legislation to reduce the number of skilled labor. This probably results from the fact, that during such periods while the numbers of experienced workmen are constantly diminishing through death or other disability, the places of those who thus are withdrawn are replaced by other skilled workmen out of employ, and beginners are not taken on.

Hence, when a revival in business comes, the diminished number of experienced workmen is not equal to the demand. If this supposition be true, it ought now to be a favorable time for apprentices to enter the trades.

Steam Heating for Cities.

CONFESSIO is good for the soul. The *Manufacturer and Builder* having in its November number confessed the errors contained in an article published on the above subject in its September number, which we pointed out in our article entitled "Steam Heating for the City of New York," printed in our issue for Oct. 1st, finds an error in our transfer of the figures of the New York Sun correspondent quoted therein, and the computation of water consumed in the case, therefore, we herewith acknowledge. The main points at issue are not thereby affected.

Among these was the quantity of steam produced per pound of coal, that can be expected with good engineering practice. Our contemporary takes off thirteen per cent. of its first statement, which reduces the amount of evaporation to twelve pounds per pound of coal consumed; and remarks that "this agrees with the results obtained by the Babcock and Wilcox boilers at the Centennial Exhibition as shown in the official report."

Now not having the report referred to immediately at hand we would ask our contemporary whether the evaporation was not stated in that report to be twelve pounds of water for every pound of combustible consumed, instead of coal? Was not the weight of ashes, cinders, etc. thrown out in those tests? By the tests, Babcock and Wilcox claim an average evaporation of twelve pounds of water per pound of the best coal obtainable. Was the amount of evaporation computed on a basis of 82° Fahr. in the feed waters at the temperature at which it could practically be returned to boilers in a system of steam heating as applied to cities? These are pertinent questions, and should receive explicit answers, if our contemporary means to be as we are assured it does, "another estimate of the economy of steam heating based on the practice of those who make this business a specialty."

Fall of an Elevator in the New York Post Office.

THE New York City Post Office was originally supplied with two hydraulic elevators, of the Thurst patent, manufactured by Davis & Nars, of Williamsburgh, N. Y., at a cost of \$35,000. These elevators are of a kind in which the car is attached to the upper section of a telescoping series of tubes, in which the injection of water elevates the car, the descent being effected by draining off the water.

These elevators have, we are informed, given constant trouble, scarcely a month passing in which repairs were not demanded.

On the 20th November, some part of the apparatus broke, and the water escaping, the elevator car descended with a series of jerks. Five persons were in the car, but none were seriously injured. It is thought that this accident will result in the removal of these troublesome and costly machines, and their replacement by more reliable and cheaper elevators.

As we go to press, the nature of the breakage has not been fully ascertained, but it is thought it may be one of the valves that gave way. To discover the defect, it will be necessary to take the machine apart, and this has not, at present writing, been done.

We should be glad to know who was originally responsible for putting in these man-traps. We understand that Mr. Mullett, the architect, gave out the contracts; but there is, doubtless, some reason not yet made public, why such expensive and complicated apparatus was preferred to the cheaper, long-tried and well approved elevators in the market.

Preserving Milk. Difficulties of Protecting a Swiss Invention.

IT is announced that Maurice Philipp, of Riesenbach, Switzerland, has discovered a method of keeping milk good and fresh in any temperature for any length of time. As to the nature of his process, nothing is known, or rather nothing has been disclosed. Three months ago he placed in the hands of the Chemical Agricultural Commissioner of Zurich a bottle containing a sample of his preserved milk, by whom it has been submitted to the severest tests. It was placed eight days in an ordinary room, the temperature of which during the day rose sometimes as high as 75° Fahrenheit, without perceptible effect on its quality, taste, or appearance. It creamed like any other milk, and butter might have been made from it, and was thought desirable to do so. The same favorable results were obtained at various intervals throughout the three months in question, and the most careful tests of Dr. Crete, President and analyst of the Commission, failed to detect in the milk any doubtful ingredient such as some experimenters have occasionally used for purposes of milk preservation. The analysis gave the following results: Specific gravity, 1.0285; water, 86.53; solid matters, 13.47 per cent. The latter consisted of casein and albumen, 3.80; fatty substances, 3.72; milk sugar, 4.25; ash, 0.74, and sundry organic matters, 0.40 per cent.

The Manchester *Examiner*, in referring to this discovery, says:

"It would be interesting to know how Herr Philipp proposes to deal with his discovery. Will he protect it by patents, or try to keep it secret and work it for his sole profit? Whichever alternative he adopts, he will find himself confronted with various difficulties. There is no patent law in Switzerland—the Swiss finding it more profitable to pirate the invention of their neighbors and take out patents in other countries than to protect their own."

Hence, if Herr Philipp patents his process, his countrymen will be let into his secret and become gratuitous sharers in its advantages. If on the other hand, he does not patent it, he runs the risk of being robbed of the fruits of his discovery by the treason of a workman or the greed of a friend, in which event his secret would speedily become common property. It is one of the intolerable anomalies of our British Patent law that, while a Swiss may retain an invention and prevent its use in England, an Englishman can obtain no protection for his inventions in the Confederation. There is nothing to prevent Herr Philipp deciding that milk shall be preserved by his process in Switzerland alone, and forbidding its use in England, or demanding therefore a prohibitive or an unreasonable royalty. It is a common thing for Continental manufacturers and others to purchase and patent inventions for the sole purpose of hindering their foreign competitors from profiting by them. A firm in Westphalia—Könecke & Behl—a short time ago brought to perfection a new needle-making machine. Without going into technicalities, it is sufficient to say that by means of it more than 100,000 needles can be stamped and bored in a day of 10 hours. The exclusive right of using it, a German paper informs us, has been acquired by the house of Wite & Co., of Iserlohn, Rhemish Prussia, who are described as the largest needle manufacturers in the world."

A Visit to the Stevens' Institute of Technology, Hoboken, N. J.

A RECENT visit to the above-named institution afforded us much pleasure, and convinced us that the full spirit of its founder's intentions is carried out in its appliances, faculty and methods.

We found the half day devoted to this visit rather too short for a comprehensive survey of even the departments of drawing and practical mechanics, which most interested us, and therefore our attention principally to these, giving a passing glance at two or three fine collections of apparatus, which comprise only a small part of the entire outfit of this amply furnished school of mechanical engineering.

The department of mechanical drawing is in charge of Prof. Charles W. MacCord, than whom, perhaps, there is not to be found a more accomplished draughtsman in any American institution. The course of study prescribed by Prof. MacCord for the students is of the most thorough character possible, and is designed to lead the student by easy gradations through the difficulties of this art, which are too often left to be stumbled at by his teachers. Some drawings were shown to us, which, executed by students in their first year, would have put to shame much of the work done by those who suppose themselves to be finished draughtsmen.

We were particularly interested in a series of engineering drawings, which were shown to us, executed by students to secure accuracy in placing centres, working from centres and taking of measurements. The character of these exercises is such that small errors of eye or hand, at first unperceived, are by accumulation, and by the time they come upon his attention. Some of these exercises executed by students showed the need of such discipline, while others amply exhibited the great benefit of it, in the truth with which, after passing through a mass of inscribed, circumscribed, and tangential figures, drawn in sequence, each in relation to the next preceding, the last is made to conform to a prescribed relation with the first or fundamental figure, which conformity tests the truth of the entire work.

"We do very little picture-making here," observed Prof. MacCord.

Nevertheless, some fine samples of India ink showing, in brush and some by pen stippling, were shown, which evinced considerable feeling for art. We may incidentally remark that, for broken sections and for granular surfaces, like that of rough iron casting, pen stippling produces a very fine effect, and is, in fact, impossible to secure by cross shading. The principal objection to it is the time and labor which it exacts from many draughtsmen, although some acquire an astonishing facility in its execution. A good example of the effect secured by this kind of shading is seen in the engraving of the Westinghouse valve for railway brakes, printed on page 193, current volume of the *SCIENTIFIC NEWS*.

The drawing tables, of which there are, perhaps, three-score, have been constructed in accordance with a design by Prof. MacCord, and are decidedly the best we have seen. They are made in such manner that all shrinkage or swelling of the wood through atmospheric changes may be quickly and wholly compensated for, and the tables are by this means always kept perfectly firm. The tops are deeply grooved longitudinally with the grain on the under side to weaken them laterally, in which direction their tendency to warp is, by this grooving, more easily and thoroughly checked by cleats dovetailed across the grain on the under side, but not screwed, glued or otherwise fastened. The cleats are attached to the under side of the tops, and, when the tops are raised, the drawers and lockers for implements and materials are supported by the legs, but have no attachment to the tops of the tables.

In this as in all, even the minutest details relating to this department, Prof. MacCord has recognized the principle that there can be no high success without attention to small things.

The machine shop of this institution is under the charge of Prof. J. E. Denton, who tells us, in the presence of the chair of Prof. R. H. Thurston, during the absence of the latter, necessitated by illness.

The course pursued in the shop is well calculated to initiate the student in the difficulties of performing and securing fine workmanship. It is precisely analogous to an apprenticeship, except that pupils are required to dwell upon a single class of work only long enough to acquire skill in it, and then to pass on to another class of work, in which some apprentices find an obstacle to gaining as wide a knowledge of different kinds of work as would be desirable, of course finds no place here.

The motor is a 5-horse power safety power engine, manufactured by Messrs. Babcock & Wilcox,

well known engineers of this city. It is supplied with steam from a Harrison boiler, which also supplies the steam for heating the building. Around this boiler are gathered a large number of appliances, such as steam-gauges, steam-traps, injectors, etc., etc., illustrating the theory and modern improved practice in the generation of steam, its dynamic and thermal properties.

The machine tools driven by the engine are three lathes—one a Pratt & Whitney, one a Sellers and the other a Star Tool Company's lathe, each having a six-foot bed and fifteen inches swing; a Sellers twenty-inch planer, a Brown & Sharpe lathe, a lathe for cutting screw threads, a Sellers Company's drill-press, two sixteen-foot bed wood-working lathes, made in the shop, and a Baldwin lathe of smaller size.

The shop is also well supplied with bench tools, leather appliances for keeping tools in proper order, in which last exercise the pupils have thorough drill—being required to give attention to the proper angles for turning tools, flat drills, etc.

An emery planer and an emery wheel, manufactured by the Tanne Company, of Stroudsburg, Pa., also form part of the outfit.

The course comprises wood-working, including model and pattern making, machinist work, in which typical examples of each are executed in accordance with a memorandum of requirements, and which are graded to lead the learner step by step through all the operations required in this class of work.

Foundry and moulding, as well as blacksmithing, are part of the course. The work is undergoing careful revision by Prof. Denton, with a view to its improvement. The theoretical and practical knowledge of this gentleman eminently fit him for this work, and the Trustees of the Institute have in him an able and efficient instructor.

Fair of The American Institute. Notes Here and There.

WE propose in this article to notice a few features and exhibits distributed here and there through the building without confining ourselves to any particular class of exhibits.

Before noticing exhibits, however, we wish to pay a merited tribute of praise to Mr. Charles Wagner Hall, the General Superintendent, who combines the manners of a gentleman with the efficiency of a mechanic, and who, in a way as far as affable and obliging, he unites the traits which best qualify a man for such a position. He is deservedly popular.

The Gregg's brick-making machinery exhibited by the Empire State Brick Co., of New York, is an important exhibit. This machine operates upon crude clay, working it with only one eighth as much water as is necessary for hand made bricks. Consequently, less fuel and fuel are required to burn them, and the bricks when burned are more dense and impervious to water than hand-made bricks can possibly be made. Bricks made by this machine have been ordered to be used in the Government work. The machine is compact, and evidently very durable. The general design is excellent, and there is no doubt it is destined to remain a standard machine for this class of work.

The Boston Belting Co., of 105 Devonshire and 54 Arch Street, Boston, exhibits a very fine collection of hard and soft rubber goods. Among these the callender rolls, covered with hard rubber, are admirable for their fine workmanship and beauty of finish. The fire hose of various kinds shown by this firm is of an admirable quality. The entire inclosure attracts much attention and elicits favorable comment.

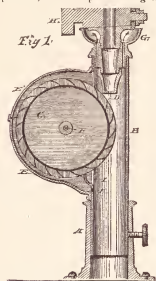
The Stevens Patent Vise Co., exhibits one of the finest callenders of the kind ever shown at these exhibitions. The various attachments for holding taper work, pipes, etc., are admirable. One of the most important of these exhibits is the planer and shaper vise, designed to hold any kind of bevel, irregular or taper work in shapers and planers. The taper attachment of this vise is self-adjusting. These vises are now used in all the Government yards, and in the Government works of many foreign countries.

Messrs. Newell & Chapin, whose works are at the foot of West 10th Street, in this city, exhibit various sizes of Newell's Patent Universal Grinder, adapted to grinding quarts, corn, horn, bones, oyster-shells, etc., in short, almost every known material that requires to be reduced to coarse or fine powder.

The grinding discs in this machine are made of hard iron or steel, with beveled edges, locked together upon a central shaft, and a cylinder with a series of angular indentures, upon the sides of which are radial cutters or teeth. Another shaft, with duplicate discs, is so placed that the projections on one cylinder fit into the spaces between the projections on the other. These cylinders revolve inwards, at differential rates of speed. In the hop-

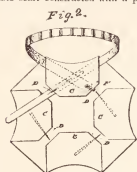
Recently Patented Inventions.

MR. WILHELM F. EVSTYR, of Chambersburg, Pa., is the inventor of the water motor shown in Fig. 1. A bucket-wheel, C, turns on an axis, F, in a circular chamber or wheel-case, placed tangentially in relation with a hollow column, B, provided at the top with a funnel, G, having a nozzle, D, which directs the flow of water upon the wheel. The column B is supported in vertical position by a hollow pedestal, A. H represents a gate which

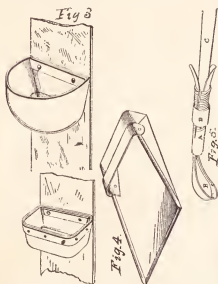


may be, for small motors, an ordinary faucet. The funnel is only employed to catch drip. This motor may be easily attached to an ordinary service pipe by a plumbier, and successfully employed for driving sewing machines, and for other purposes requiring light power. The impact of water under a considerable head would impart more force to such a wheel than might at first be supposed.

An ingenious improvement in scarfs, patented by Mr. Howard Schvage, of Brooklyn, N. Y., Assignor to Rufus Waterhouse, is illustrated in Fig. 2. The invention consists in the combination with a changeable scarf constructed with a plurality of



shields, C, arranged around its periphery, and a neck-band, the holding pins, D, attached obliquely to the several shields, and a hook, E, at the free end of the neck-band, adapted to engage with any one of the shields when the band is passed diagonally beneath the same, all as herein described and shown.



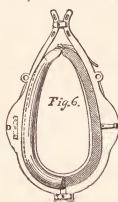
In Fig. 3 is shown an improvement in elevator-buckets, by William A. Avery, of Detroit, Mich.

The bucket is struck up from a single piece of sheet metal, and formed with a flat bottom, curved front and sides, and a flat back.

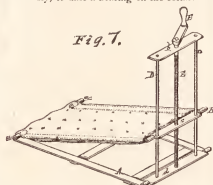
Mr. George H. Howe, of Syracuse, Ill., makes a dustpan of paper, and bands the edges with sheet metal, as shown in Fig. 4. A light, cheap and durable implement is the result attained.

To fasten lashes to whips more firmly and durably is the object sought in the invention of Mr. John I. Fowler, of Ukiah, Cal., illustrated in Fig. 5. The whip-stock has at its tip a split ferule, A, exteriorly threaded, and to this is fitted a nut, D, which binds the split ferule down upon the lash-loop.

Mr. John S. Brown, of Galveston, Texas, has applied sheet metal to the manufacture of harness for harness. They have slots for the straps at top



and bottom, and are of greatest width where the traces are connected, and this part is curved backwardly, to take a bearing on the collar.



In Fig. 7 is shown an adjustable head-rest, the invention of Amanda B. Manwaring, of Detroit, Mich. It consists of the rectangular base-frame, A, the rectangular frame, B, pivoted at a to the base-frame, and having a pivoted girt, c, at its opposite end, and the propping-frame having top and bottom girts, the latter pivoted in the base-frame, and provided with screw-rod E, working in the girt, c, and operated by a crank, F, and with steadying side rods, D, passing through the girt, c.

An improvement in eye-glasses, calculated to make them more comfortable to the wearer, is the invention of Franklin Perin, of Cambridge, Mass. The glass-frames A are provided with projections to receive the ends of the spring B, and with two



independent bands holding projections on each frame to receive a rubber nose band, having pockets at each end which engage the projections. The glasses, when worn, are held upon the nose by the soft elastic pressure of these bands.

To these unhappy young men, whose mustaches obstinately refuse to coalesce into the delicate aptured tip, in which the female heart takes delight and which often compensates for a deficiency of interior cranial developments, Victor M. Law, of Cedar Rapids, Iowa, comes with a blessed relief. The anxious cure which has burdened many a weary bosom may now cease, since this philanthropist has devised means and method for what we may appropriately call the education of the mustache. The hand, the eye, the ear, the nose, the mouth, all these have been trained to adapt them to various callings and professions. "Why not the mustache?" thought Mr. Law. "Why not?" will echo the mustache-growing public. It not requires the employment of a simple implement, ornamental in appearance, which may be made of any material, to suit large or diminutive purses, and which, while imparting a peculiar yet indescribably pleasing and attractive expression to

the countenance of the wearer, compels the most heterogeneous and incongruous mustache to immediately become adapted to its environment and assume the refined form so ardently longed for.



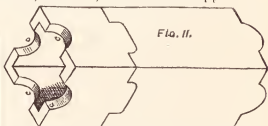
The device may be described as a split tube hinged to open and close longitudinally, and provided with a clasp or snap, by which, when closed, it holds the struggling hairs in a sure embrace. The engraving, Fig. 9, well illustrates the effect both upon the mustache and the spirits of the wearer. A collateral but minor advantage is that the device keeps the mustache out from the soup at dinner; but the chief end is evidently as above set forth, as this is the point chiefly dwelt upon in Mr. Law's specification.

Fig. 10 illustrates a vehicle spring, the invention of James Walsh, of New York. This spring has the offsets in the two parts A A', throwing them out of vertical range, and the ends of the parts are



connected one above the other, the middle of the lower part extending above, and the middle of the upper part extending below, the heads of the spring.

Fig. 11 represents an improvement in clay pipes (tiles, flue-linings, etc.), invented by Nathan G. Walker, of Wellsville, Ohio. It consists in a pipe-



section having interlocking edges, such as tongues and grooves, either or both, set at an angle with each other, to adapt the section to lock against lateral displacement when the section is joined with its counterpart.

An improvement in electric conductors for speaking telephones, etc., is the invention of Mr. Adolphus Knudson, of Brooklyn, N. Y. It is shown in Fig. 12. It is composed of a spiral elastic coil of

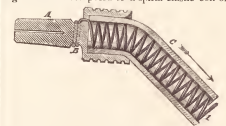


FIG. 12.

wire, covered with an elastic and flexible insulating tube, and a plug, A, with a socket to receive the end of the covered coil and hole through which an extension of the wire passes and winds around the contracted neck of the plug.

"The Boiler Explosion at Hoboken."

BY EDWARD E. MACGOWAN.

On Tuesday, Oct. 28, as the train, which leaves Hoboken at 8:42 P. M., was just leaving the depot, a terrific explosion occurred, blowing a piece out of the boiler on the right-hand side of the engine in a line with the steam dome and about 2 ft. distant therefrom. The fracture was a very peculiar one; the piece blown out was five feet eleven inches long and eighteen inches wide. The locomotive, by force of the explosion, was thrown on her left side, and, from some unexplained cause, the engineer was blown to the left and under the left hand driver. Death must have been instantaneous. The fireman was blown about 30 ft. in the air, and received such injuries as resulted in his death a few days after. In his ante-mortem statement he affirmed that the engine was blowing off steam and that there were three solid cocks of water. Owing to the peculiar nature of the explosion, the Coroner called an expert in boilers, whose testimony follows:

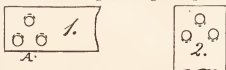
"Henry Waterman, M. E., of Hudson, New York State, was sworn: I received my knowledge of steam boilers, etc., entirely in the practical school. I entered a machine shop in 1834, and am at present considered an expert in all matters pertaining to boilers. I am the original inventor of the "Pop Safety Valve," as applied to locomotives. I have examined the boiler of the locomotive No. 15, Lehigh, of the Morris and Essex Division of the Delaware, Lackawanna & Western R.R. I find it similar to all locomotive boilers. [Here followed a description of the boiler.] I found the usual number of stay bolts; the crown bars were supported by a half a dozen braces in excess of the usual method of supporting them. A great many locomotive boilers—fully one-fourth of those in use—have none of these braces, the usual method being considered as being fully capable of enduring the strain. These braces are not to strengthen the arch of the boiler, but to assist in supporting the crown sheet below, which I consider the weakest part of a boiler. Taking the boiler as a whole, considering the thickness of the iron and the distribution of bracing, I think I may safely say that I never saw a boiler in which the strains were so anticipated and provided for. I have made computations providing all braces removed, and allowing only the boiler iron to resist the strain, and I find that the margin of safety of 400 per cent. The workmanship of the boiler is faultless; this is shown by the fact that now, after the explosion, every part of the work, in relation to the workmanship, stands intact. There is nothing apparently, after examination with a magnifier, to indicate weakness or crystallization of the iron. When there is a pressure on the boiler, and a smart rap of the hammer is given to it, this would be sufficient to produce crystallization, and consequently, weakness. A like effect would be due if the throttle were opened suddenly, allowing the wheels to slip, and then suddenly closed again, giving a tremendous jar to the engine. There is such evidence in this case, The iron was rolled at "Abbott's Baltimore Mills," and is marked "C. H. No. 1." It is as good iron as is made anywhere. I know from personal observation that that brand of iron is charcoal iron. I did not have access to the steam gauge which was on the locomotive when it exploded. There is no means of knowing what pressure was indicated, after the pressure was removed. Steam gauges are generally tested at the General Office of the road, then placed on the engine; steam is then raised until a certain point is reached, generally, 130 lbs., and then the pop valve is set so as to blow off at this point. The pop valve is commonly set by the master mechanic, and engineers are not allowed to alter it. The pop valve and pressure gauge should always correspond; and when an engineer finds they do not, he naturally, for his own safety, reports the case to the master mechanic. The wear and usage of pop valve springs is always on the safe side, i. e., the spring never becomes stronger by wear. I did not examine the boiler for a safety plug, as there were no indications of low water; this can always be told by the appearance of the crown sheet. If it is bulged out between the braces, it is an unfailing sign. There was no such an appearance in this boiler. Iron, when subjected to a strain of under 50,000 lbs., undergoes about 1/1000 of its length temporarily. If the tensile strain be greater than that, the iron loses a portion of its elasticity and sets permanently, i. e., its modulus of elasticity becomes smaller. Had I been engineer of that locomotive, I should have felt just as safe as I feel now. The thickness of the iron in this case was 7/8 of an inch, which is the proper thickness of locomotive boilers. If it is heavier, it is not so elastic, and therefore more liable to be injured. I do not think that hard and soft water used in a boiler weakens it. They tend rather to correct each other's errors. The primary cause of explosion is a mystery to me. There are a great many forces acting on a boiler, the knowledge of

the laws of which is purely theoretical. None of these laws [?] have been demonstrated. An additional row of rivets would not have held the piece blown out. The cold water test is never used in boilers of locomotives; it would tend to weaken it. In conclusion, I never was so much in the dark as to the cause of an explosion, in any practice, as I am in this case.

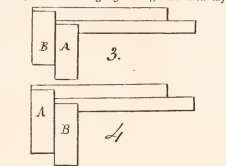
Hints on Machinist's Try-Squares.

BY JOSHUA ROSE, M. E.

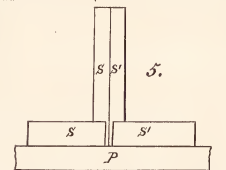
The blade should be made of saw-blade, so as not to take a permanent set when bent. The holes should be drilled a trifle smaller than the rivets, and after drilling should be filed out as denoted by the dotted lines in Fig. 1, A being the edge that



beds in the square-back. The holes in the back should be filed out as shown by the dotted lines in Fig. 2, so that driving the rivets in will key the blade in the back, and keep it tight independent of the riveting. True the squares, one with the other, as shown in Figs. 3 and 4, and then lay

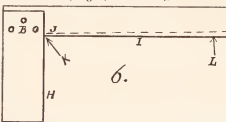


them on a surface plate and true as in Fig. 5, in which P is a surface plate and S and S' the two



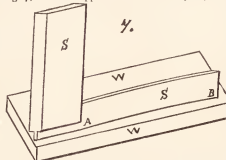
squares; and when corner in all these positions the edges will be at a right angle, one to another.

It is better to set the blade so that its point shall be too low at L, Fig. 6, and no filing will be re-



quired at the corner, K, when truing the blade parallel with the line J.

If the blade is not straight, but curved, as in Fig. 7, and it be applied to a flat surface, W, the



ends A and B only will touch the work, although the latter may be true; hence the stock, S, should be laid at a right angle to the work.

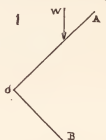
Speed of Ice-Boats.

THE QUESTION DISCUSSED BOTH SCIENTIFICALLY AND PRACTICALLY BY EXPERTS.

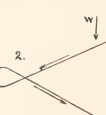
To the Editors of the SCIENTIFIC NEWS:

The SCIENTIFIC NEWS, in recently quoting my letter to the *Evening Post* relative to speed of ice-boats, stated that the expression "tacking away from the wind" was not quite clear. Permit me to endeavor to make it so, and at the same time to point out the fallacy of the so-called wedge theory for explaining the ice-boat paradox.

When a vessel is impelled by a wind coming from any direction, excepting from directly astern, she is driven by a constant force, which produces an accelerated motion until overcome by the resistance of the water, or, in the case of an ice-boat, by that of the friction between the runners and the ice. When sailing before the wind, the movement of the ice-boat is no longer accelerated, because the faster she goes the less the wind pressure on her sail becomes, and therefore the force of the wind is not constant. Hence it is disadvantageous to sail with the wind directly astern; while, on the other hand, the best speed of an ice-boat is reached when the breeze is on the quarter, or at an angle of 135° with the line of the keel. Thus, with the wind coming from W, in



the direction of the arrow, it would be better to sail from A to C and from C to B than to run directly from A to B. This is analogous to a vessel beating or tacking against the wind, as in going from B to A, reversing the course above stated. Now, tacking away from the wind, or "beating to leeward," which is the more correct expression, is not confined to ice-boats. Fast sea-going yachts often prefer to sail the longer course to running before a dangerous sea and heavy gale. When such craft go about or turn the corner at C, they



luff up into the wind and make a loop, as shown in Fig. 2, the arrow, W, representing the wind and the other arrows the direction of the boat's motion.

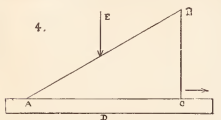


The alternative to doing this is to "wear"—that is, simply to turn the corner, as shown in Fig. 3; but this involves the sudden swinging over of the sails, called "jibbing," which is often a dangerous manœuvre.

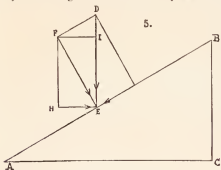
Paradoxical as it may seem, the ice-boat goes through the movement of wearing—that is, she turns the corner without making a loop, while, in fact, she tacks or beats to leeward. This is a sequence of her speed exceeding that of the impelling breeze. The moment she begins to turn she is met by a breeze of her own making. She is going so fast that the pennon at her mast-head streams straight against the actual breeze, while her sails shake just as if she was running into a strong head-wind. The result is that there is no sudden jibe of the sails, but they are swung over gradually, just as in ordinary tacking. This is what is meant by "tacking away from the breeze," or "beating to leeward."

Now, as regards that "wedge theory," experimentally proved, (2) as follows: A B C, Fig. 4, is a draughtsman's triangle of steel or wood, with

smooth edges; D is a ruler held rigidly; both triangle and ruler are laid flat on a smooth surface. Pressure is applied along the line A, B, in the direction of the arrow, E. The triangle slides in the



direction A, C, and obviously while the pressing force is moving a distance, B, C, the triangle must travel over a length equal to its base, A, C. A, C is longer than B, C—ergo, the triangle moves faster than the force which impels it, Q, E, D. The fallacy here is in ignoring the amount of pressure and



in confusing statical and dynamical relations. Let A, B, C, Fig. 5, represent a wedge free to move without friction along the line, A, C. The condition of the problem is that the line, B, C, shall represent the direction and velocity of the wind for a given time. The wind acts on the side, A, B, which represents the sail of the boat; and we may lay off D, E equal to B, C, and consider the force applied to the centre of pressure, E. By regarding D, E as the diagonal of a parallelogram, we may resolve it into the effective force, F, E, acting perpendicularly to the sail, and the ineffective force, E, G, parallel thereto. In the same way we may resolve F, E into I, E and H, E, the former simply moving the vessel sideways, H, E therefore represents the effective force of the wind, B, C, to drive the vessel straight ahead during the given time, and also the distance passed over by the wind, and, consequently, is the total distance which the assumed wind, B, C, could move the boat. In other words, it would be utterly impossible, the wind represented in force and velocity, or space passed over in a given time, by B, C, to move the wedge farther than the distance, H, E.

In order that the wind may be caused to travel farther than H, E in a given time, the pressure must be augmented; but to increase wind pressure is to increase its velocity, and to increase the length of the line, B, C, which is contrary to the conditions of the problem.

The experimenter with the triangle and ruler unconsciously ignores his hypothesis, because he applies all the unmeasured pressure necessary to make his triangle move, and he can do so as slowly as he chooses. This is not true of the wind, for the greater the pressure the greater the velocity, and the conditions of fact and experiment are thus widely different.

But, if we proceed a step further, and remember that the force, H, E, is constantly applied to the sail, then it is evident that the motion of the boat becomes accelerated and faster and faster, as already explained. But this has nothing to do with the imaginary fact that any wind traveling over B, C makes an ice-boat travel over A, C, as I trust, is now apparent.

I send herewith some interesting letters from President Barnard and Commodore Grinnell and Roosevelt (respectively of the New Hamburg and Poughkeepsie Ice Yacht Clubs). President Barnard affirms the explanation which I have advanced, and the two conclusions which it up with some remarkable data relative to ice-boat speed.

PARK BENJAMIN, Ph.D.

15 North Washington Square, Oct. 23, 1879.

PROF. PARK BENJAMIN.

DEAR SIR: I have received from home a list of the ice-yacht regattas of our "New Hamburg Club" for the few years past, and I am glad to find being that of the committees who governed the races, and the distance is likewise efficient, but the velocity of the wind is only approximate, for we have no wind gauge to prove its real force. Many of us, however, have followed the, water all our

lives and always study the weather and wind; and we can judge, I think, approximately, just as a jockey, without his watch can, by experience tell pretty nearly the gait of his horse. You will be surprised not to find, perhaps, a higher rate of speed, but you must know that our regattas are "round races" (to a mark and return), and in such a race an ice-yacht can never make throughout as good time as in a straightaway sail; for part of the time she must be sailing at her poorest rate, viz., against the wind. Even if she can lay her course to and from the mark without tacking (which would necessitate a "beam wind") her time would still be only moderately good, for this is not her best point of sailing.

An ice-yacht attains her greatest speed with a wind "about the beam" or "three-quarters free." Hence we can never show in our round races anything but a good average speed, while in some of our private sails we have recorded, when running *en de* in the direction most conducive to speed, a rate of "a mile a minute." Thus the "Whiz" has a record of 9 miles in 8 minutes; the "Zag Zag" of 4 miles in 5 minutes; the "Waik" of 2 miles in 60 seconds. In the above cases the wind was blowing at the rate of about 20 to 22 miles an hour.

My "Flying Cloud" has, on several occasions, been timed over a mile course with a steady wind of about 18 miles an hour, and has made the mile in 65 seconds, 61 seconds and 58 seconds.

Again it must be borne in mind, that the same wind does not always produce the same speed either in the regattas or in private sails, for the surface of the ice is not always perfect; and a little grit or hail frozen in, or the mere mist of snow here and there, rapidly increases the friction and diminishes the speed.

If you still desire more records of regattas, I can, I think, obtain those of the "Poughkeepsie Club," though they have fewer races than we have, and a poorer course, and I doubt if they have retained any of their records. Their results, however, for all practical purposes, will be the same as ours, for their regattas are also round races. Inclose, also, a circular that hung on my ice-yacht at the "Centennial," which may be of a little interest to you; and, if I can be of any service to you again on the ice-yacht question, I beg you will call upon me. I intend this winter to gauge the wind with an instrument, and thus be accurate on the only point where we are dependent on our own judgment. As I said in my card of day before yesterday, I am laid up at present with a broken ankle; but I would be delighted to have a personal interview with you, at any time, if it would better suit your pleasure and convenience; and if you will kindly send up your card, I will gladly see you. I wrote a short article upon the ice-boat question, "from a practical standpoint," for last Friday's *Post*, but it reached them too late; whether they will publish it in tomorrow's issue or not, I do not know. I have changed it a trifle, owing to the articles which appeared last week.

Very truly yours,

IRVING GRINNELL.

(Com. "New Hamburg Ice-Yacht Club," N. Y.)

Official Time of Winning Yachts over the "New Hamburg Ice-Yacht Club's" Course, at New Hamburg, N. Y., for Several Years Past.

	Miles.	Time, in s.
Quickest	.....12.5	.....15
Old Wive	.....12.5	.....28.30
Plym	.....12.5	.....30
Whirl	.....12.5	.....35
Zephyr	.....12.5	.....39.15
Phantom	.....12.5	.....39.48
Whirl	.....12.5	.....39.24
Fly	.....12.5	.....40.24
Phantom	.....12.5	.....42.30
Puff	.....12.5	.....39.30
Mag	.....12.5	.....40.13
Phantom	.....12.5	.....40.44

[COPY.]

Poughkeepsie, N. Y., October 18th, 1879.

PARK BENJAMIN, ESQ.

MY DEAR SIR: Your favor of 17th inst. has just reached me. The question of an ice-yacht's speed exceeding that of the wind is simply fact. I do not believe either the editors of the *Post*, or Messrs. Loomis and Barnard understand that this speed is attained *only* by sailing away from the wind and across it, or three-quarters free. If any one of these doubting gentlemen will stand on the ice, facing the wind, they can feel what they know to be a light breeze, and see at the same time an ice-yacht darting backwards and forwards at twice the velocity of the wind. Such a squall of wind as you see creeping over the water in summer would suit an ice-yacht at the rate of thirty miles an hour.

Another thing that people do not generally understand is, that the flatter a sail sets, the faster a yacht will go on the wind, as it strikes her and passes over. As for friction on hard ice, you can

put your little finger in the ring of a jib, and draw an ice-yacht weighing 900 pounds from a stand still with little effort. The river above Poughkeepsie is more than half a mile wide by actual measurement—I have sailed the "Ice" diagonally across in 15 seconds, with a favorable current. The yacht was timed by her owner, Mr. Aaron Innis, and several other gentlemen who stood on Kaal rock, in full view of the course. About 15 miles to windward per hour, is all that an ice-yacht attains under the best and most favorable stances; therefore the time of a regatta will disappoint those who come to see a mile a minute make, and it is seldom we get smooth ice with a steady wind, to lay a course down the river and return without tacking or jibing. I regret to say that many false statements have been published about the speed of ice-yachts, but that they will run a mile per minute, with the velocity of the wind 30 miles per hour, there can be no doubt, as we have proved it. It will give me great pleasure if you, or one of your staff, will visit me some early day, when I can place at your disposal scrap-books containing the records I have been able to collect in the past sixteen years, and will enjoy talking over the subject.

Yours very truly,

[Signed] J. A. ROOSEVELT.

Extract from a Letter from Dr. Barnard, above referred to, dated Oct. 24th, 1879.

"When I replied to Mr. Hubert's question I had no idea that my reply was to be printed. I understood him to ask whether an ice boat could sail faster before the wind than the wind itself, and I replied, according to my understanding of the matter, *no*. When the *Post* of Friday last appeared, I discovered that I had misunderstood the question, and made haste to write to him to tell him so.

"When a boat sails on ice or on water, obviously away from the wind, there will be, of course, an accelerative force acting upon the sails until the velocity of progress shall have become more or less greater than that of the wind itself. Whether the force shall be sufficient to produce an actual acceleration up to that point, must depend upon the relation of the force to the resistance. On the water, we know that the resistance predominates in all cases, and the boat is retarded. On the ice, it would appear, to a *prima facie* view, that it would not; and experiment, as well as computation from experimental data, confirms this anticipation. It is, therefore, undoubtedly true that an ice boat can, under the most favorable conditions, sail directly with the wind nor beats against it."

Important Decision. Unconstitutionality of the Trade Mark Law.

THE United States Supreme Court, rendered a decision on the 17th October in the cases of the United States vs. *Wheat*, *Wheat* vs. *Wheat*, *Wheat* vs. *Wheat*, and *Wheat* vs. *Wheat*, which are prosecutions for violations of what are known as the Trade Mark laws. The cases came before the Supreme Court on certificates of division from the Circuit Courts of the United States for the Southern District of New York and the Southern District of Ohio. The question upon which the Judges of the lower courts were divided in opinion, and which the Supreme Court was to decide, was whether the Trade Mark laws, which are the subject of trade marks are founded upon any rightful authority in the Constitution of the United States.

It was maintained by counsel, who sought an affirmative answer to this question, that there are two clauses of the Federal Constitution which furnish a sufficient warrant for the legislation in dispute. The first is the eighth clause of section 8, article 1, which provides that Congress shall have power to pass laws "to promote the progress of science and the useful arts by securing for limited times to authors and inventors the exclusive right to their writings and discoveries." In regard to this point, the Court holds that the ordinary trade mark has no necessary relation to invention or discovery. The Court is, therefore, of the opinion that such legislation is not authorized by the constitutional provision concerning authors and inventors and their writings and discoveries.

The other clause of the Constitution relied on to support this legislation is the third of the same section, which provides that Congress shall have power "to regulate commerce with foreign nations and among the several States and with the Indian tribes." With regard to this the Court says that this legislation contemplates the establishment of a universal system of trade-mark registration for the benefit of all who have already used a trade-mark, or who wish to adopt one in future, without regard to the character of the trade to which it is to be applied, or the locality of the owner. Such

legislation is, in the opinion of this Court, in excess of Congressional power. The Court wishes, however, to be understood as leaving the whole question of the treaty-making power of the general Government over trade marks and the duty of Congress to pass any laws necessary to carry such treaties into effect, untouched. The question in each of these cases, viz.: whether these statutes can be upheld in whole or in part as constitutional, must be answered in the negative, and it will be so certified to the Circuit Courts.

Under the provisions of the laws which have thus been declared unconstitutional about 8,000 trade marks have been registered at the Patent Office, and about 200 applications for registry are now pending.

New Process for Preserving the Dead.

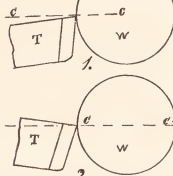
Mr. KREBMAN, United States Consul-General at Berlin, in his dispatch to the Department of State, communicates a description of a newly discovered process for the preservation of dead bodies. The German Government has induced the patentee to abandon his patent and has made public a description of the process. The following extract is translated from the Berlin newspapers:

The dead bodies of human beings and animals by this process fully retain their form, color and flexibility for years and may be dissected, while decay and offensive smell are completely prevented. Upon incision the muscular flesh shows the same appearance as in the case of a fresh dead body. The liquid used is prepared as follows: In 5,000 grammes of boiling water are dissolved 100 grammes of alum, 25 grammes of cooking salt, 12 grammes of saltpetre, 60 grammes of potash and 10 grammes of arsenic acid. When cool it is filtered. To 10 litres of this liquid, 4 litres of glycerine and 1 litre of methyl alcohol are added. The process of embalming is by saturating and impregnating the bodies with it. From 1½ to 5 litres of the liquid are used for a body.

OVER fifty patents have been obtained for cow-milkers, thirteen in England and forty in America. These machines have been divided into three classes. First, tube-milkers; second, sucking-machines; third, mechanical hand-milkers. The first are tappers, the second suckers, and the third squeezers and strippers. Some devices are formed of combinations of these classes. As yet no one machine can be considered a success, as the constant use seems to forward a tendency toward drying off the cow.

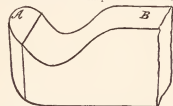
Shop and House Hints.

Lathe Rests for Screw Cutting.—The top of a lathe rest should always be horizontal for screw cutting, otherwise the thread will not be of the right angle or depth, though the tool be to correct angle. In Figs 1 and 2, W is a piece of work and T,



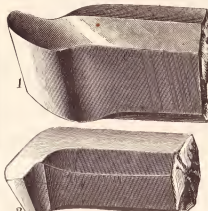
the tool, C being a line horizontal, and in the same plane as the work centre; and it will be readily observed that the tool being out of level will not cut a thread of the same angle or depth as the tool edge itself.

Round Nosed Tools.—Will not jump or dig into the work if made of the shape shown in the figure.

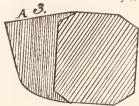


the cutting edge A in no case standing above the surface B, of the tool.

Best Shapes for Boring Tool.—For wrought iron or copper, the form shown in Fig. 1. For brass or composition that shown in Fig. 2, or if the tool-point stands far out from the slide rest, that shown in Fig.



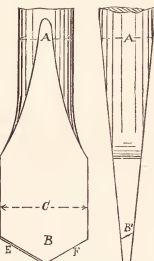
3. For cast-iron that shown in Fig. 4, the cutting edge A, standing parallel with the bore of the work. These shapes are such as will allow the body of the steel to



be as stout as possible in proportion to the size of hole in which it will operate. All these tools will stand well if hardened and not tempered.



Flat Drills should not be much tapered at C in the accompanying cuts, but very nearly parallel. There should be very little clearance at E, F, unless for very soft metal, when as much as is shown at B may be given.



Care of Oil-Cloths.—To clean oil-cloths, wash always with warm milk. Once in six months scrub with hot soapsuds, dry thoroughly and apply a coat of varnish. They will last as long again.

Cleaning Tinware.—The best thing for cleaning tinware is common soda. Dampen a cloth and dip in finely powdered soda, and rub the ware briskly, after which wipe and dry. Any blackened or dirty ware can be made to look as well as new.

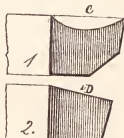
IMITATIONS OF MEERSCHAUM, IVORY, AND PEARL.—A peeled potato is placed in sulphuric acid and water, in the proportion of eight parts of the former to one hundred of the latter. It remains in this liquid thirty-six hours, is dried with blotting paper and submitted to pressure, when it becomes a material that can be readily carved. An imitation ivory, sufficiently hard for billiard balls, is made by greater pressure. Imitation coral is obtained by treating carrots similarly.

Etching on Zinc.—L. K. is informed in reply to his query, that he can etch upon zinc by the use of dilute sulphuric acid, one part strong commercial acid to ten of water. Heat the metal and rub it over with beeswax, which, when cold, will adhere in a thin film. Place the stencil or pattern upon the waxed surface, and outline the pattern on the wax with a pointed needle. Then scrape off the parts, or take out with a pointed instrument the lines which require to be bitten in by the acid. Then immerse the plate in the acid for a few seconds, remove it and wash it thoroughly in clean water. If the etching be not deep enough, dip it again and again till the acid has bitten in sufficiently. Lastly wash in pure water, and then in water containing a little alkali. The wax remaining can be removed by heating the plate. We give elsewhere some receipts for other etching varnishes.

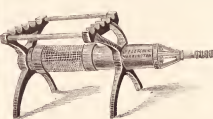
Etching Varnishes.—White wax, 2 ounces, asphaltum, 2 ounces. Melt the wax in a clean iron vessel, and add the asphaltum in a powdered state. Boil till it reaches the proper consistence, and then pour it into warm water. When cool enough form it into balls, which may be wrapped in muslin to keep for future use.

Another: White wax, 2 ounces; Burgundy pitch, ½ ounce; black pitch, ½ ounce. Melt together, and add, gradually, 2 ounces powdered asphaltum. Boil till a drop cooled on a plate is found to be brittle.

Cutting-Off Tools.—Cutting-off tools for wrought iron will cut much better if hollowed out in front, as shown at C, in Fig. 1, but for brass should be ground off as at D, Fig. 2, which will greatly improve them. By an inadvertence this hint appeared in our last issue without the diagrams.



Improvement in Bunsen Burners.—New Remedies illustrates an improvement in Bunsen gas-burners recently introduced in England by Thomas Fletcher. The first is what the inventor calls a "Horizontal Solid Flame Bunsen," the appearance of which is shown in Fig. 1. It is said to be adapted to a great



variety of uses where a low and steady flame is needed; as in laboratories, for cooking, small engines, etc. No external air supply is required. The gauge is so fastened by loose rings that it can be replaced by a fresh sheet in a few seconds when this becomes necessary. Another modification in this burner is shown in Fig. 2, in which a cylinder of metal with open ends con-

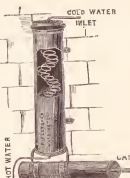


Fig. 2.

tains a spiral of fine metal tube. This is used to heat water to a boiling point in the shortest practicable time. Cold water being allowed to flow through the tube, enters at the top of the spiral and is discharged below; the gas burner below being ignited,

Middlesex scouter and pointer, G. Sumner.	331,731
Mill-dressing apparatus, J. H. Koffield.	331,730
Millstone-dress, W. C. Hale.	331,729
Millstone-driver, W. H. Dakey.	331,727
Mining-shovel, J. M. Robinson.	331,726
Mirrors, winging, J. Parry.	331,725
Motion, mechanism for controlling, respecting	331,724
into rotary, W. T. Burrows.	331,723
Moser, J. M. Cayce.	331,722
Musical instrument, mechanical, E. F. Needham	331,721
(renew).	8,676
Musical instrument, mechanical, J. P. Needham.	331,720
Musical instrument, mechanical, C. A. Needham.	331,719
Not-lock, R. Frantz (reissue).	331,718
Not-lock, D. R. Pratt (reissue).	331,717
Oatmeal machine, S. Stanford.	331,716
One reducing and pulsating, for compressing	331,715
mer.	331,714
One separator, H. H. Wood and J. B. Boydell.	331,713
Paint and roofing compound, T. D. McKinstry.	331,712
Paint can, G. R. Cawle.	331,711
Paint for filling the seams of vessels, H. P. Webb.	331,710
Paint for filling the seams of vessels, H. P. Webb.	331,709
Paper bag, S. E. Petter.	331,708
Paper mill-rig-engines, bed plate for, A. Hinkley.	331,707
Paper, &c., treatment of pine leaves for the manu-	331,706
facture of, A. W. Mass.	331,705
Peeling machine, J. J. Farnham.	331,704
Pen and pencil case, W. Appleton.	331,703
Pen, Fountain, C. Tenkman.	331,702
Pernambuco bark, M. A. Deane and J. B. Boydell.	331,701
Pigments of white lead, &c., making, G. T. Lewis	331,700
and E. O. Bartlett.	8,675
Planning-machine tables, &c., making, E. F. Gooden.	331,699
Plow, J. J. Farnham.	331,698
Pressure regulator and indicator, J. H. Farnham.	331,697
Printing and folding machine, W. Scott.	331,696
Printing machine, self-acting, apparatus, J. H. Farnham.	331,695
Pruning implement, D. Boker.	331,694
Pulley-belt attachment, J. H. Farnham.	331,693
Pulley-shave, F. B. Torrey.	331,692
Pump, J. Bean and E. H. Moore (reissue).	331,691
Pump, C. W. Dawson.	331,690
Ray-broke, vacuum, N. Hodge (reissue).	331,689
Railway, Elevator, J. B. Boydell.	331,688
Railway track, portable, A. Heyn.	331,687
Rattan scraping and stripping machine, G. S. Col-	331,686
burn.	8,674
Refrigerator, J. C. Hewson.	331,685
Rein-rolling machine, H. J. and J. Sauerbrey.	331,684
See-handle, R. Gates (reissue).	8,673
See-wat, S. Holton.	331,683
Saws, machine for sharpening cotton-gin, J. Farnham.	331,682
Sawing-machine gauge, circular, E. F. Gordon.	331,681
Sawing machines, self-acting, attachment for, J. H. Farnham.	331,680
See-handle, R. Gates (reissue).	8,672
Scales, pendulum, H. J. and J. Sauerbrey.	331,679
Screw-nail, H. A. Harvey.	331,678
Seedling-machine teeth, locking device for, T. Gallo-	331,677
way and J. Lerner.	331,676
Sewerage, J. W. Crane.	331,675
Sewing-machine cord, J. H. Farnham.	331,674
Shall-support, vehicle, D. B. H. Farnham.	331,673
Shirt, R. O. Davies.	331,672
Shutter-holder, W. Schellert.	331,671
Simpson, O. J. Bickus.	331,670
Slide-cleaner and pencil-holder, combined, M. Lel-	331,669
der.	8,671
Spinning-ring and mechanism for adjusting the	331,668
same, J. B. Farnham (reissue).	8,670
Stamp, hand, B. F. Asper.	331,667
Stamp, hand, B. F. Asper.	331,666
Stamp-mill can, L. A. Moore (reissue).	331,665
Stamping press, machine for, W. R. Landfair.	331,664
Steam boiler, G. Mattheis.	331,663
Steam heater, J. B. Pierce.	331,662
Stereotype machine, composition for, L. E. Jamn.	331,661
Stereotype plate, J. B. R. Leptine.	331,660
Stone-crusher, T. A. Blake.	331,659
Stone, C. Portway.	331,658
Stone and range door, W. C. Davis.	331,657
Stone-chips, B. F. Stockford.	331,656
Stone-logs, W. McDonald and S. H. Farnham.	331,655
Stone-pipe, bending attachment for, W. Suman.	331,654
Stone, ventilating, cold-house, J. Crumlin.	331,653
Stump extractor, M. F. M. W. and H. A. Parrish.	331,652
Sugar in centrifugal machines, apparatus for liqui-	331,651
ing, A. A. Gombert.	331,650
Suspender buckles, strap-pulley support for, W. F.	331,649
Olson.	331,648
Suspenders, J. B. Williams.	331,647
Target-belt, spring-strap for throwing, F. X. Mul-	331,646
holland.	8,669
Telegraph, duplex, G. S. Mott.	331,645
Telegraph line, and cable, J. H. Farnham.	331,644
Tellurian, G. McBride.	331,643
Teils, compound for drain, H. F. Bondock and E.	331,642
T. May.	331,641
Time-lock, M. A. Dalton.	331,640
Tre-tightener, E. H. Hargrave and E. P. Hargrave.	331,639
Tobacco, process and apparatus for curing, J. H.	331,638
Ogden.	331,637
Torpedo, oil-well, S. H. Farnham.	331,636
Toy, E. L. Morris.	331,635
Traction engine, C. M. Millard.	331,634
Trackle-power mechanism, J. Millard.	331,633
Truck, hand, J. Allen.	331,632
Tunnels, condenser, self-acting, apparatus, J. H. Farnham.	331,631
Carson.	331,630
Type-setting machine, J. N. Farnham.	331,629
Vehicle spring, W. B. Baker.	331,628
Wagon cover, T. Danahy.	331,627
Wagon jack, J. Allen.	331,626
Warping and bounding machines, exposure stand	331,625
for, L. C. Entwistle.	331,624
Watch-winding attachment, S. H. Cate.	331,623
Water, apparatus for raising, J. H. Farnham.	331,622
Water-closet, &c., valve, T. H. Cate.	331,621
Water-elevating apparatus, J. H. Farnham.	331,620
Water-elevator, J. C. Barrett.	331,619
Water-elevator, R. M. Cullin.	331,618
Water-meter, J. H. Farnham.	331,617
Weather-board gauge, J. D. Hobbs.	331,616
Weeder or scraper, F. H. Farnham.	331,615
Weighing apparatus, C. Jensen.	331,614
Wells, device for supporting tubing or pipes in oil,	331,613
W. R. Edlen.	331,612
Whip, J. E. Curtis.	331,611
Wind engine, M. D. Cate.	331,610
Work-basket stand, J. W. Wolcott.	331,609
Yarn, machine for winding, J. and T. A. Boydell.	331,608

PREMIUM LIST.

Scientific News, 1880.

We desire to call the attention of our present subscribers, and others who may be induced to solicit subscriptions for the SCIENTIFIC NEWS, to the unprecedented list of premiums of money and articles of general utility and value presented hereafter. Every article offered is from a First-Class Manufacturer and is guaranteed to be worth in this market the full retail value set against it.

In this enterprise, as in all others, we propose to deal upon strictly honorable and fair principles.

We offer, it will be seen, two classes of premiums, *Competitive and General*.

Those who intend to compete for the cash premiums must send us a written notice of such intention.

The class of general premiums is offered for specific numbers of subscribers only; but any one who competes for a cash premium, and fails to get it, may choose from the class of general premiums any article specified as the premium for such a number of subscribers as he may be able to secure, and will be entitled to receive such premium.

In this way, no one forwarding to us any number of subscribers equal to, or exceeding, the small cost number named in this list, will fail to receive a premium.

Remittances may be forwarded by check postal order, or in cash by express, express charges to be prepaid.

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Address, S. H. Wales & Son, Office of the SCIENTIFIC NEWS, No. 10 Spruce St., New York.

LIST OF PREMIUMS.

CLASS I.

CASH PREMIUMS FOR COMPETITION.

No. 1.—For competition, we offer in cash as a premium for the largest number of subscribers sent in on or before Feb. 1st, 1880, by any single person, **\$100**

The subscriptions may be sent from different post-offices and in installments or all at once, as the person competing chooses.

No. 2.—For the second largest list we will give to the person sending the same, on same conditions, **\$50**

No. 3.—For the third largest list we will give as a premium, on same conditions as above, **\$25**

Those receiving these competitive premiums will not be entitled to premiums for the same subscribers from the general premium list which follows; but all those who enter as competitors and fail to obtain either of the competitive premiums, may demand for the number of subscribers they send as a premium corresponding thereto, as above explained.

GENERAL PREMIUMS.

These premiums may be selected, one premium corresponding to the number sent, or two or more premiums the equivalent of the same.

Any one approximating a number of subscribers for which is offered a particular premium, may remit to us in cash 80 per cent. of the money they fall short of reaching the required sum, also the sum required to meet the subscriptions they send us, and they will then be entitled to the premium selected by them.

For instance, suppose some one should wish to secure the \$50 Remington Sewing Machine, to receive which he must send us 105 subscribers at one dollar and ten cents each, or \$115.50. Should he get no more than eighty subscribers, and should prefer this sewing machine to any other premium to which eighty subscribers would entitle him, he may, by sending in addition to the \$88 collected from the eighty subscribers, send us 80 per cent. of the remaining \$27.50, which amounts to \$22, and he can receive this premium.

GENERAL PREMIUM LIST.

No. 1. Wheeler and Wilson Sewing Machine. No. 8, plated, back end leaves, cover and 3 drawers. **\$50.00**

We will present this premium to any one who sends us 105 subscribers at \$1.10 each.

No. 2. Remington Half Cabinet Sewing Machine. drop leaf and two drawers, with hemmer, feller, braider and gauge. **\$30.00**

Will be presented to any one sending us 95 subscribers at \$1.10 each.

No. 3. Remington Double Barrel Shot-Gun. 10 or 12 gauge, 28 or 30 inch, walnut stock, decorated with gold barrel. **\$40.00**

Will be presented to any one sending us 50 subscribers at \$1.10 each.

No. 4. Wyck's Circle Bed Foot Lathes. A strictly business lathe, strong, accurately made and durable, 36 inch bed, turns 8 inches diameter and 24 inches long. Brass boxes, three cone pulleys and round belt. **\$30.00**

Will be presented to any one sending us 95 subscribers at \$1.10 each.

No. 5. Wyck's Circle of the Sciences. A scientific library in itself, 4 royal octavo vols., handsomely and substantially bound and profusely illustrated by steel and wood engravings, 2,360 pages. **\$10.00**

The subjects, all of which are treated by scientists of the first rank, are:

Heat. Meteorology.
Light. Astronomy.
Photography. Comparative Anatomy.
Electricity. Zoology.
Metallography. Geology.
Magnetism. Botany.
Mechanical Philosophy. Economic Botany.
Applied Mechanics. Practical Geology.
Astronomy. Trigonometry, Plane and Spherical.
Navigation. Spherical.
Natural Astronomy. Generations.
Electro-Telegraphy. Logarithmic Tables of natural numbers, sines, &c.
Chemistry. Crystallization.
Algebra. Mineralogy.
Series and Logarithms. Geography.
Geometry. Plane and Spherical. Geology.

Any one may gain a complete scientific education from this work.

We offer this premium to the first one who will send us 80 subscribers at \$1.10 each, if he chooses in preference to other premiums. If he do not choose, we will send him one of the class of subscribers at the same rate, and wishes this valuable premium, may have it.

TAKE NOTICE.—Only one person can receive this premium, and the first to apply for it on the conditions named will be the one to get it.

No. 6. A Magnificent Art Work. Illustrated Catalogue of the Masterpieces of the United States International Exhibition of 1876, 64 parts at 50 cents each. **\$32.00**

Contains 40 steel plates of the most valuable and, over 1,000 wood engravings of the finest exhibits, with descriptive text.

Will be presented to any one sending us 76 subscribers at \$1.10 each.

TAKE NOTICE.—Only one person can receive this premium, which is offered on the same conditions as No. 5.

No. 7. Full Set Turning Tools. 45 in all, comprising 1 milling tool, 2 chasers, a bent inside tool, 4 flat tools, 2 side tools, 3 point tools, 4 round point tools, 5 drawers, 1 cutting off tool, 11 Gouges, graduated sizes, 10 chisels, graduated sizes. **\$10.00**

We will present this premium to any one sending us 72 subscribers at \$1.10 each.

No. 8. Waltham or Elgin Watch. Solid silver case, excellent time-keeper. **\$20.00**

We will give this premium to any one who will send us 40 subscribers at \$1.10 each.

No. 9. Tool Chest.—Peck & Snyder—containing full set, 60 first-class tools. **\$20.00**

We will present this premium to any one who sends us 39 subscribers at \$1.10 each.

No. 10. Compound Microscope. with rack-motion and glass, pivoted stand and walnut case. **\$15.00**

Good work can be done with this instrument. We will give this premium to any one who sends us 40 subscribers at \$1.10.

No. 11. Elegant Graphoscope. with one doz. selected views. **\$10.00**

These views are of American objects of interest, and may be selected from a long list, which will be forwarded to the applicant for the premium. They are first-class.

We will give this premium to any person sending us 22 subscribers at \$1.10 each.

No. 12. Stereo Views. above, without the views. **\$7.00**

We will give this premium to any one sending us 16 subscribers at \$1.10 each.

No. 13. Case Brass Drawing Instruments. German work, 10 pieces, fine. **\$6.00**

We will give this premium to any one who sends us 24 subscribers at \$1.10 each.

No. 14. Microscope. 3 lenses, pivoted stand, glass, &c. **\$10.00**

We will give this premium to any one who sends us 18 subscribers at \$1.10 each.

No. 13. Stereoscope. Rosewood, nickel-plated metal work, and one doz. selected views. **\$1.50**
We will give this handsome premium to any one who sends us 12 subscribers at \$1.10 each. The views may be selected in the same manner as for No. 11.

No. 16. Same as above, without the views. **\$3.00**
We will give this premium to any one who sends us 8 subscribers at \$1.10 each.

No. 17. Photographic Album. Elegant, full Morocco, gilt edges, oblong, holds 80 cards **\$3.00**
We will present this premium to any one who sends us 11 subscribers at \$1.10 each.

No. 18. Stereoscope, patent folding, with one doz. selected views. **\$3.00**
We will send this premium to any one who will forward us 8 subscribers at \$1.10 each.

No. 19. Same as No. 18, without the views. **\$2.00**
We will give this premium to any one who sends us 8 subscribers at \$1.10 each.

No. 20. Case Drawing Instruments. Brass, 10 pieces, rosewood box, with tray **\$2.50**
We will give this premium to any one who will send us 7 subscribers at \$1.10 each.

No. 21. Same as No. 20, without the tray. **\$2.25**
We will give this premium to any one who sends 6 subscribers at \$1.10 each.

No. 22. Case of Brass Drawing Instruments. 10 pieces, smaller than Nos. 20 and 21 **\$1.85**
We will give this premium to any one who sends us 5 subscribers at \$1.10 each.

No. 23. Achromatic Spy-Glass. Very fine; $1\frac{1}{2}$ inches long; $\frac{1}{2}$ inch diameter **\$3.00**
draws **\$1.00**
We will give this premium to any one who sends us 13 subscribers at \$1.10 each.

No. 24. Achromatic Spy-Glass. $1\frac{1}{2}$ inches long, object glass 1 inch diameter, 3 draws **\$3.25**
We will give this premium to any one who will send us 6 subscribers at \$1.10 each.

Archery Sets. Manufactured by Johnson, of Pittsburgh, Pa. Each set includes patent bow, $\frac{1}{2}$ doz. arrows, target, arm-guard and finger-grips.
We offer 3 sets only, of different sizes, each of which will be given to the first one who sends in the proper number of subscriptions to obtain it, with a request for the same. The retail prices of the sets are as follows:

No. 25. Target, 30 inches diameter; bow, $6\frac{1}{2}$ feet, with arrows to suit, arm-guard and finger-grips; all **\$15.00**
We will give this premium to the first one who selects it, sends us 25 subscribers at \$1.10 each.

No. 26. Target, 30 inches diameter; bow, 6 feet; arrows to suit, arm-guard and finger-grips. **\$10.00**
We will give this premium to the first one who selects it and sends in 20 subscribers at \$1.10 each.

No. 27. Target, 26 inches diameter; bow, 4 feet; arrows to suit, arm-guard and finger-grips. **\$7.00**
We will give this premium to the first one who selects it, and who sends us 14 subscribers at \$1.10 each.

The above bows and targets are patented. The bows have metallic centres with arrow-ribs, or "c-rings" as they are called, which permits the arrow to pass without touching the feather, and on a line exactly midway between the tips of the bows, which secures accuracy of flight. The wood limbs of the bows are of second growth white ash, hand-painted and are provided with nickel-plated metal tips that cannot break. They are detachable from the metallic centres of the bows, which enables the weapon to be packed in small space for transportation. Remember we have only one set of each size to award; each to the first who claims it on above-named conditions.

No. 28. Improved Demas Foot Lathe, with scroll sawing attachment, solid emery wheel and 5 turning tools. **\$8.00**
This is the nicest thing of the kind ever offered at the price. Nothing like it in the market. Nicely fitted steel spinning collars, spur centre and screw for attaching chain, cassette and ball chucks go with it. No other lathe has these valuable attachments. Come pulley, with two lifts, for heavy and light work. Two sets of two rests, one 4 inch and one 12 inch. Remember all this goes in this premium, besides 25 New Process designs, a drawing of the new invention and a Manual of Turning and Fret-Sawing. This beautiful and useful premium may be earned by any one who sends us 24 subscribers at \$1.10 each.

No. 29. Holtz Serrated Saw with 7 valuable improvements: 1st. It has a solid emery wheel. 2d. Improved clamps. 3d. Pivoted nickel-plated tilting table. 4th. Straining rod. 5th. Improved method of setting up. 6th. It will saw 20 inches from blade to centre. 7th. New Style of painting in ultramarine blue, decorated in gold and silver. With the saw we give, free, 20 New Process designs, 6 extra blades, 1 Manual of Fret Sawing. These designs, and the new invention and saw, can be instantly transferred. **\$3.00**
Any one sending us 9 subscribers at \$1.10 each will receive this premium.

No. 30. Stylographic Pen, short, plain. **\$3.0**
No. 31. Stylographic Pen, gold-mounted. **\$3.50**
No. 32. Stylographic Pen, long, plain. **\$4.50**
No. 33. Stylographic Pen, gold-mounted. **\$5.00**

(Nos. 30 to 33 with alloy points, Nos. 30 to 37 with iridium points.)
These pens write with ink, but look like an ordinary ball pen. When filled with ink they can be used for a great deal of writing without any further supply and can be carried in the pocket in a small case. Not a particle of ink escapes *except* when writing. The distinctive feature of the pen is that it can be held point downward for any length of time and not a drop of ink will escape; but touch the writing point to a piece of paper, and it makes a mark. Draw the pen along on the paper and it makes a continuous line. The pen will write at a single filling from 8,000 to 20,000 words. The materials used in its construction, vulcanized rubber, gold, silver and iridium, are non-corrosive, and no injury or expansion of the ink can occur; the pen can be filled in a moment; it works equally well on any kind of paper; any kind of copying ink or writing fluid can be used; it will run from the edge of a business card without blotting; it can scarcely get out of order. The entire construction is very simple, and the pen is only partly liable to rust, is covered when not in use with an air-tight cap. We have had this pen in continuous use in our office for months and speak positively of its merits.

No. 30 will be given for 5 subscribers at \$1.10 each.
No. 31 will be given for 6 subscribers at \$1.10 each.
No. 32 will be given for 6 subscribers at \$1.10 each.
No. 33 will be given for 7 subscribers at \$1.10 each.

No. 30 will be given for 8 subscribers at \$1.10 each.
No. 31 will be given for 9 subscribers at \$1.10 each.

No. 32 will be given for 10 subscribers at \$1.10 each.
No. 33 will be given for 11 subscribers at \$1.10 each.

No. 30 will be given for 12 subscribers at \$1.10 each.
No. 31 will be given for 13 subscribers at \$1.10 each.

No. 32 will be given for 14 subscribers at \$1.10 each.
No. 33 will be given for 15 subscribers at \$1.10 each.

No. 30 will be given for 16 subscribers at \$1.10 each.
No. 31 will be given for 17 subscribers at \$1.10 each.

No. 32 will be given for 18 subscribers at \$1.10 each.
No. 33 will be given for 19 subscribers at \$1.10 each.

No. 30 will be given for 20 subscribers at \$1.10 each.
No. 31 will be given for 21 subscribers at \$1.10 each.

No. 32 will be given for 22 subscribers at \$1.10 each.
No. 33 will be given for 23 subscribers at \$1.10 each.

No. 30 will be given for 24 subscribers at \$1.10 each.
No. 31 will be given for 25 subscribers at \$1.10 each.

No. 32 will be given for 26 subscribers at \$1.10 each.
No. 33 will be given for 27 subscribers at \$1.10 each.

No. 30 will be given for 28 subscribers at \$1.10 each.
No. 31 will be given for 29 subscribers at \$1.10 each.

No. 32 will be given for 30 subscribers at \$1.10 each.
No. 33 will be given for 31 subscribers at \$1.10 each.

No. 30 will be given for 32 subscribers at \$1.10 each.
No. 31 will be given for 33 subscribers at \$1.10 each.

No. 32 will be given for 34 subscribers at \$1.10 each.
No. 33 will be given for 35 subscribers at \$1.10 each.

No. 30 will be given for 36 subscribers at \$1.10 each.
No. 31 will be given for 37 subscribers at \$1.10 each.

No. 32 will be given for 38 subscribers at \$1.10 each.
No. 33 will be given for 39 subscribers at \$1.10 each.

No. 30 will be given for 40 subscribers at \$1.10 each.
No. 31 will be given for 41 subscribers at \$1.10 each.

No. 32 will be given for 42 subscribers at \$1.10 each.
No. 33 will be given for 43 subscribers at \$1.10 each.

No. 30 will be given for 44 subscribers at \$1.10 each.
No. 31 will be given for 45 subscribers at \$1.10 each.

No. 32 will be given for 46 subscribers at \$1.10 each.
No. 33 will be given for 47 subscribers at \$1.10 each.

No. 30 will be given for 48 subscribers at \$1.10 each.
No. 31 will be given for 49 subscribers at \$1.10 each.

No. 32 will be given for 50 subscribers at \$1.10 each.
No. 33 will be given for 51 subscribers at \$1.10 each.

No. 30 will be given for 52 subscribers at \$1.10 each.
No. 31 will be given for 53 subscribers at \$1.10 each.

No. 32 will be given for 54 subscribers at \$1.10 each.
No. 33 will be given for 55 subscribers at \$1.10 each.

stand on an office or library table. It is made wholly of iron, in such a manner that it can never wear out. It is the most compact book-case in the world, and holds the maximum in capacity, and is highly finished, beautifully ornamented, and suitable for any room, as it is an ornament in itself.

We offer the following:
No. 41. For table, to hold 1 tier of books. **\$10.00**
No. 42. For table, to hold 2 tiers of books. **\$13.00**
No. 43. For floor, to hold 2 tiers of books. **\$12.00**
No. 44. For floor, to hold 3 tiers of books. **\$15.00**
No. 45. For floor, to hold 4 tiers of books. **\$18.00**

No. 41 will be presented to any one who sends us 24 subscribers at \$1.10 each.
No. 42 will be presented to any one who sends us 29 subscribers at \$1.10 each.

No. 43 will be presented to any one who sends us 34 subscribers at \$1.10 each.
No. 44 will be presented to any one who sends us 39 subscribers at \$1.10 each.

No. 45 will be presented to any one who sends us 44 subscribers at \$1.10 each.

No. 46. Statham's Boy's Own Laboratory. **\$10.00**
This is a handsome box of chemicals and chemical apparatus. Contains 54 chemical preparations, and 300 printed directions for performing experiments. Endless experiments in chemical science free from danger.

We will present this elegant premium to any one sending us 24 subscribers at \$1.10 each.

No. 47. New York Club Skate. Manufactured by Peck & Snyder. Any size to fit. Any one who sends us 5 subscribers at \$1.10 each will be entitled to this premium.

No. 48. Men's and Boys' Clothing. Manufactured by Rogers, Peet & Co. Any one who sends us any number of articles or articles of men's or boys' clothing of equivalent value, manufactured by the above-named house. Upon forwarding to us the name of the article or articles required, we will send full directions for self-measurement for the same to secure a fit, and upon return of the measurements to us we will forward the article or articles by express, prepaid, to Peck & Snyder & Co. have a first class reputation as manufacturers of men's and boys' clothing, and their goods may be fully relied upon.

A Tobacco-Chewing Donkey.

I HAD been with a friend to visit a lime-kiln wherein a patent process was in operation. My friend, a resident in a Yorkshire village, took a deep interest in its moral and spiritual welfare. He was the organizer of a benevolent society, the founder of a penny bank, the secretary of a club, the librarian, the treasurer, and I know not what besides. Some few weeks previously he had indulged one of his philosophical fancies in the use of a "chewing donkey," and had quoted, as an instance of the unattractiveness of the acquired taste of it, the instinctive repugnance manifested by the animal kingdom to the narcotic weed. I cannot tell what he thought when we were told that he was to be invited to a dinner party by a friend who was a member of his committee-men or members of his society, a donkey with an unmistakable liking for a chew. To put the assertion to the test, I gave a boy a piece of tobacco for the donkey. Noddy immediately took it and chewed as gravely as any American Senator. When he had done, he showed his teeth and indulged in a grin as broad as that of any Cheshire cat. For my own part I interpreted the grin as a grin of disgust, for the donkey refused a second plug from me, but when the boy again took a handful he picked up his ears, eat it from his hand, and munched as gravely as before.

SOLAR BELL-KINGING.—An ingenious and simple apparatus for making a bell ring at any predetermined hour of the day is described in a recent number of *L'Electricité*. It comprises a lens by means of which the solar rays are concentrated and directed on a metallic strip, which is susceptible of very rapid and great dilatation. The result of the dilatation is electric contact, giving passage to a battery current which rings the bell. Although the sun may be covered by clouds, its calorific power is never diminished so much as not to dilate the strip. "It is to be inferred," says M. Desmarest, who describes it, "to know what the action of the moon would be, through a lens of high magnifying power on a very sensitive strip. The apparatus, perhaps, too, be susceptible of gradation with a view to studying the radiating power of the sun."

JUTE.—By a new process, the details of which are not yet published, it has been proved that the fibrous portion of the jute plant can be so divided and treated as to produce curtains, hangings, table-cloths and dress goods of rare excellence.

PATENT DEPARTMENT.

In connection with the publication of the *SCIENTIFIC NEWS*, we make it part of our business to secure patents in the United States, Canada, Great Britain, France, Germany, Belgium, Austria, Russia, Italy and other countries. Cases invented, designs patented, Trade-marks and Labels registered. Adjudged Cases prosecuted. Revenues obtained. Interferences managed. Assignments and Licenses prepared. Careful special searches made at the Patent Office. Inventors who write to us will receive prompt answers to their inquiries. Nothing needful to be done to secure success will be omitted by us in the prosecution of cases entrusted to our care. We shall take cases at prices from \$10 to \$50 and upwards, depending, of course, upon the amount of labor involved in the preparation of the application. All communications will be regarded as confidential.

INVENTORS who employ us to prepare and prosecute their claims before the Patent Office, can at all times rely upon honorable treatment and careful attention to their case. In fixing our charges we recognize the necessity of the times and make them as low as possible.

Our friend, Mr. Salem H. Wales, in connection with the *Scientific American*, of which he was one of the proprietors and editors for twenty-three years, has had a very extensive experience in connection with Patent affairs. Mr. Edward H. Wales has been connected with the Patent Office. We understand our business. We prepare our cases with great care and present them with vigor. We do not intend to abandon our case before the Patent Office so long as we think our client is entitled to a reasonable and proper claim.

As to our fitness and responsibility for the business, read what the *New York Evening Post* says, Dec. 29, 1876, under the caption "A Good Candidate?" "Mr. Salem H. Wales is mentioned as a possible successor to Mr. Duell as Commissioner of Patents. As editor of the *Scientific American*, he has had more than twenty-three years' experience in connection with patent interests, and his high personal character would be an additional recommendation. It is not known that he would accept the office, but he would make a good officer."

The *New York Star*, of Oct. 2nd, 1875, published in its editorial columns the following: "When Mr. Wales was one of the editors of the *Scientific American*, and was devoting his energies and his mechanical knowledge to the development of the inventive genius of our people, he organized an admirable system for the obtaining of patents, classifying the various inventions according to the essential principles upon which they were based, and the uses to which it was sought to adapt them."

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Under this heading we will publish, as may be demanded, without charge, any request for information about machinery or other appliances desired by any of our readers, or needed in their business or household economy, giving the full name and address of the person who makes the inquiry, that other readers who have the article required for sale, or know where it may be obtained, may communicate directly with the inquirer. It is obvious that we cannot gratuitously publish answers to such inquiries, they being in the nature of advertisements; but if any manufacturer wishes to publish answers in order to reach others beside the one specially seeking the information, he may do so in our column of "Business Hints" at 50 cents per line.

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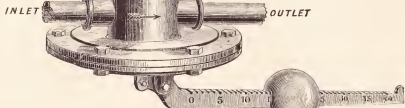
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As a newspaper, THE SUN believes in getting all the news of the world promptly, and presenting it in the most intelligible shape—the shape that will enable its readers to keep well abreast of the age with the least unproductive expenditure of time. The greatest interest to the greatest number—that is the law controlling its daily make-up. It now has a circulation very much larger than that of any other American newspaper, and enjoys an income which it is at all times prepared to spend liberally for the benefit of its readers. People of all conditions of life and all ways of thinking buy and read THE SUN; and they all derive satisfaction of some sort from its columns, for they keep on buying and reading it.

In its contents on men and affairs, THE SUN believes that the only guide of policy should be common sense, inspired by genuine American principles and backed by honesty of purpose. For this reason it is, and will continue to be, absolutely independent of party, class, clique, organization, or interest. It is for all, but of none. It will continue to praise what is good and reprobate what is evil, taking care that its language is to the point and plain, beyond the possibility of being misunderstood. It is unflinching by motives that do not appear on the surface; it has no opinions to sell, save those which may be had by any purchaser for two cents. It hates injustice and rascality even when that it hates unnecessary words. It abhors frauds, pities fools, and deplores nincompoops of every species. It will continue throughout the year 1880 to chase the first class, notice the second, and discountenance the third. All honest men, with honest convictions, whether sound or mistaken, are its friends. And THE SUN knows no bones of telling the truth to its friends and about its friends whenever occasion arises for plain speaking.

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to exaggerate the importance of the political events which it has in store, or the necessity of resolute vigilance on the part of every citizen who desires to preserve the Government that the founders gave us. The debates and acts of Congress, the utterances of the press, the exciting contentions of the Republican and Democratic parties, now nearly equal in strength throughout the country, the varying drift of public sentiment, will all bear directly and effectively upon the twenty-fourth Presidential election, to be held in November. Four years ago next November, the will of the nation, as expressed at the polls, was thwarted by an abominable conspiracy, the promoters and beneficiaries of which still hold the offices they stole. Will the crime of 1876 be repeated in 1880? The past decade of years opened with a corrupt, extravagant and insolent Administration intrusted at Washington. THE SUN did something toward dislodging the gang and breaking its power. The same men are now intruding to restore their leader and themselves to places from which they were driven by the indignation of the people. Will they succeed? The coming year will bring the answers to these momentous questions. THE SUN will be on hand to chronicle the facts as they are developed, and to exhibit them clearly and fearlessly in their relation to expediency and right.

Thus, with a habit of philosophical good humor in looking at the minor affairs of life, and in great things a steadfast purpose to maintain the rights of the people and the principles of the Constitution against all aggressors, THE SUN is prepared to write a truthful, instructive, and at the same time entertaining history of 1880.

Our rates of subscription remain unchanged. For the DAILY SUN, a four-page sheet of twenty-eight columns, by mail, post paid, is 35 cents a month, or \$6.50 a year; or, including the Sunday paper, an eight-page sheet of fifty-six columns, the price is 63 cents a month, or \$7.70 a year, postage paid.

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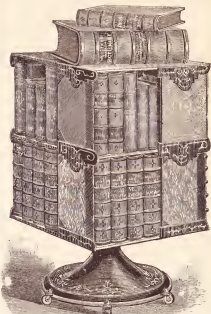
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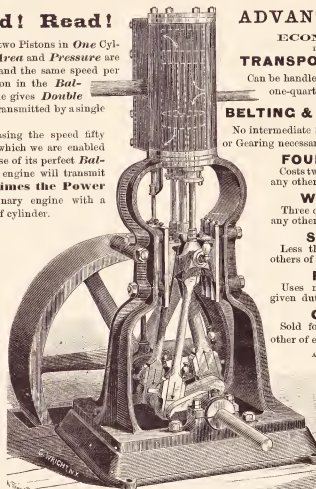
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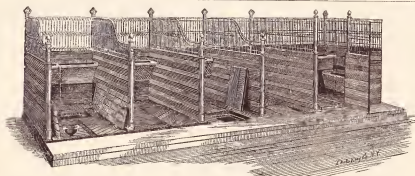
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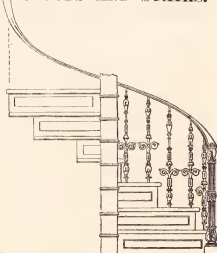
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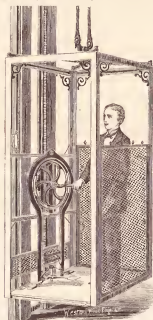
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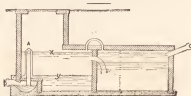
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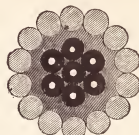
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